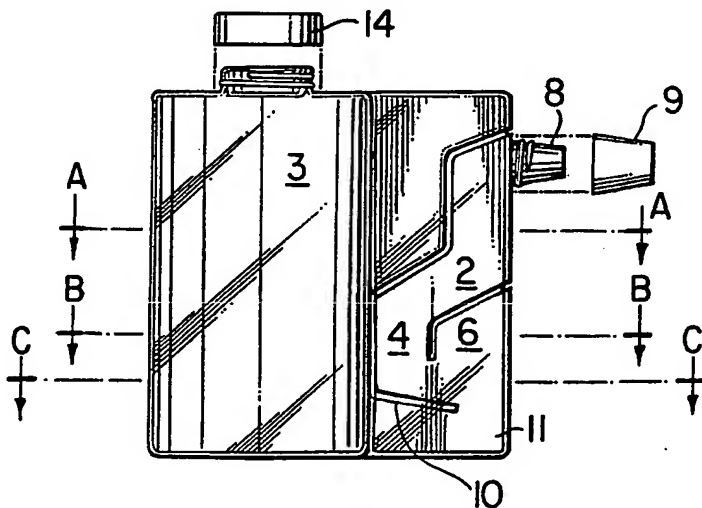




## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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**(54) Title:** VISCOUS LIQUID DISPENSER WITH INTEGRAL MEASURING DEVICE**(57) Abstract**

There is disclosed a viscous liquid dispenser (1) comprising a reservoir (3) for holding the liquid (at least a part of the reservoir (3) being resiliently squeezable), a measuring channel (2) for measuring therein a quantity of the liquid to be dispensed, a spout (8) in communication with an upper part of the channel (2), and an air trap including an air chamber (6) and a passage (11). A lower end (4) of the channel (2) is in communication with one side of the chamber (6), and the passage (11) communicates an opposite side of the chamber (6) with the reservoir (3). In this way, upon squeezing the reservoir (3), the flow of the liquid through the passage (11) to the lower end (4) of the channel (2) across the chamber (6) from the opposite side to the one side is able in use to release the air bubble from the chamber (6) into the lower end (4) and, upon releasing the reservoir (3), to replenish the chamber (6) with air drawn back through the spout (8), channel (2) and air trap to the reservoir (3).

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## Viscous liquid dispenser with integral measuring device

Field of the Invention

The present invention relates to a viscous liquid dispenser which permits a measuring of the liquid to be  
5 dispensed. The invention relates further to a viscous liquid dispenser of the squeeze-bottle type or of the attachment type.

Background of the Invention

It is known that viscous liquids are often difficult  
10 and messy to measure for dispensation, since the liquid is difficult to pour into a measuring cup and slow to remove from the measuring cup. It is therefore desirable to have a container which is able to dispense a measured quantity, so that the use of a measuring cup or the like is avoided.

15 Some of the viscous liquids which are advantageously dispensed from a container capable of measuring are: liquid detergent, shampoo, oil, syrup and honey.

Summary of the Invention

An object of the invention is to provide a viscous  
20 liquid dispenser which can be used to measure and dispense a quantity of viscous liquid.

Another object of the invention is to provide a viscous liquid dispenser which can be used to measure a variable quantity of viscous liquid.

25 A further object of the invention is to provide a viscous liquid dispenser which can be inexpensively made from one integral moulded piece.

According to the invention, there is provided viscous liquid dispenser comprising a reservoir for holding the

liquid, at least a part of the reservoir being resiliently squeezable, characterized in that the dispenser comprises: a substantially vertical measuring channel having a cross-section suited to allow a bubble of air in the liquid to move along the channel with a flow of the liquid therein, the bubble in the channel for measuring a quantity of the liquid to be dispensed; a spout in communication with an upper part of the channel; and air trap means including an air chamber and passage means, a lower end of the channel being in communication with one side of the chamber, and the passage means communicating an opposite side of the chamber with the reservoir. In this way, upon squeezing the reservoir, the flow of the liquid through the passage means to the lower end of the channel across the chamber from the opposite side to the one side is able in use to release the air bubble from the chamber into the lower end and, upon releasing the reservoir, to replenish the chamber with air drawn back through the spout, channel and air trap means to the reservoir.

20 According to the invention there is also provided a dispenser for dispensing a viscous liquid, the dispenser to be connected with a reservoir for holding the liquid, at least a part of the reservoir being resiliently squeezable, the dispenser characterized in that it comprises: a substantially vertical measuring channel having a cross-section suited to allow a bubble of air in the liquid to move along the channel with a flow of the liquid therein, the bubble in the channel for measuring a quantity of the

liquid to be dispensed; a spout in communication with an upper part of the channel; and air trap means including an air chamber and passage means, a lower end of the channel being in communication with one side of the chamber, and  
5 the passage means communicating an opposite side of the chamber with the reservoir. In this way, upon squeezing the reservoir, the flow of the liquid through the passage means to the lower end of the channel across the chamber from the opposite side to the one side is able in use to  
10 release the air bubble from the chamber into the lower end and, upon releasing the reservoir, to replenish the chamber with air drawn back through the spout, channel and air trap means to the reservoir.

#### Brief Description of the Drawings

15 The invention will now be better understood by way of the following description of a preferred embodiment with reference to the drawings wherein:

Fig. 1 is a perspective view of a squeeze-bottle dispenser according to the preferred embodiment;

20 Fig. 2 is a side view of the dispenser of Fig. 1;

Fig. 3 is a horizontal cross-section of the squeeze-bottle of Fig. 1 about line A;

Fig. 4 is a horizontal cross-section of the squeeze-bottle of Fig. 1 about line B; and

25 Fig. 5 is a horizontal cross-section of the squeeze-bottle of Fig. 1 about line C.

#### Detailed Description of the Preferred Embodiment

In the preferred embodiment, the dispenser (1) is used as a honey dispenser for dispensing a desired quantity of

honey into a beverage such as tea or coffee. The dispenser (1) is a one piece, blow moulded, translucent, squeezable plastic bottle. Channel (2) is provided outside reservoir (3). Dispenser (1) is made from thermoplastic material such as polyethylene or polypropylene, by blow molding techniques in which an extruded parison is blown into the general shape of the bottle. The wall thickness of the dispenser (1) is such that the walls are flexible while retaining the fabricated shape of the dispenser (1).

10 As shown in Figs. 1 and 2, the dispenser (1) has a reservoir (3), a channel (2) extending along a front vertical side, a spout (8) in communication with a top part of channel (2), a bottom inlet (4) of channel (2), and an air chamber (6). Dispenser (1) is provided with an opening  
15 covered and sealed by screw-cap (14) for filling reservoir 3, and channel (2) is provided with graduation marks or lines (12) to serve as indicating means for measuring a level of a bubble therein. Spout (8) can be covered by cap (9).

20 As shown in Fig. 2, channel (2) is formed to go around chamber (6) toward the center of reservoir (3). Chamber (6), inlet (4), shelf (10) and passage means (11) form air trap means in communication between lower part (4) of channel (2) and reservoir (3). Passage means (11) are  
25 defined by the walls of bottle (1) and shelf (10), and the passage means (11) provide a flow path between reservoir (3) across chamber (6) to lower part (4).

Fig. 3 shows the horizontal cross-section of the

essentially ellipsoid shaped reservoir (3) and the essentially square shaped horizontal cross section of channel (2).

Fig. 4 shows the horizontal cross-section of dispenser (1) and air trap means including air chamber (6) and inlet (4).

Fig. 5 shows the horizontal cross-section of dispenser (1) along the line of shelf (10) of the passage means (11) interconnecting reservoir (3) with the air trap means.

10 With reference to Fig. 2, shelf (10) extends from the left side wall of inlet (4) to a position under chamber (6). The position of the right side of shelf (10) is such that flow through passage means 11 rises into chamber (6) at the right side thereof so that an air bubble is thereby  
15 pushed down and out from the left side of chamber and into inlet (4).

When the reservoir is partly filled with honey, a measured quantity may be dispensed as follows:

1) bottle (1) is squeezed until the level of honey in  
20 channel (2) reaches the top of channel (2) and begins to enter spout (8).

2) bottle (1) is tilted from vertical as if to pour the honey from spout (8), placed over the beverage where the honey is desired, and further pressure is  
25 applied to the bottle (1) to begin dispensing the liquid. An air bubble is released from chamber (6) into inlet (4) of channel (2).

3) When the air bubble is emitted at spout (8) (this is easily detectable by the interruption in the flow

of honey out of spout (8)), pressure is released and bottle (1) is returned to rest on a level surface. The measured quantity of liquid is thus dispensed. Squeeze bottle (1) then draws air through spout (8) and channel (2) into reservoir (3) until bottle (1) 5 regains its natural shape. As air is drawn through inlet (4) and passage (11), air chamber (6) is replenished with air and the bottle (1) is ready for its next dispensation.

10 By this method, a predetermined quantity is dispensed. In the preferred embodiment, this quantity is a volume of honey having the sweetness of one teaspoon of sugar. A little more honey can be dispensed by squeezing a little more after the bubble is emitted from the spout (8). 15 Quantities less than one teaspoon may be dispensed by stopping the squeezing before the bubble reaches the spout (8). For this purpose, graduations (12) are provided on the transparent or translucent channel (2) so that squeezing may be stopped at a calibrated point such as one half 20 teaspoon.

When dispenser (1) is not in use, cap (9) shown in Fig. 2 is used as closure means to seal out air from channel (2), so that the honey stays fresh.

The bubble is released in the method described above 25 by the action of the honey flow across the base of the chamber (6) as well as by tilting the dispenser (1) to pour the honey from spout (8). Although it is a bit slower, one may cause a bubble to be released from chamber (6) by



tilting alone. The chamber, being also made of the same resilient material as the rest of the dispenser (1), may also be squeezed to release the bubble. Any one or any combination of the above mentioned three ways can be used 5 to cause the air trap means to release the bubble.

Although the invention has been described as using the example of a bottle (1) having squeezable sides, it is to be understood that other pressure generating means are possible according to the invention, such as a pump or 10 "accordion" section of the bottle. The closure means could also include a suitable valve provided either in the spout (8) or channel (2). The air chamber (6) can be located at other positions with respect to inlet 4.

The dispenser may also be an attachment unit to be 15 attached to a separate replaceable reservoir (3). In this embodiment, it is preferable to provide the dispenser with a base, the base being part of the passage means, in which the base has an inverted screw cap fitting for attaching to a reservoir bottle by screwing the bottle into the base in 20 an upside down position.

Although only one channel (2) and air trap means are shown in the Figures, it is of course possible according to the invention to provide dispenser (1) with two or more channels and air trap means. Two channels and air trap 25 means can be advantageous under certain conditions. The exact dimensions of the height, and cross-sectional area of the channel, and the number of channels and air trap means, are parameters which can be determined. The factors to be considered are the viscosity of the liquid, surface tension

and the maximum desired quantity of liquid to be dispensed. The pressure generating means must be able to expel enough liquid into the measuring channel (2) for measuring, then must expel the desired quantity out the spout (8). Thus in the case of the squeeze-bottle (1), reservoir (3) must be capable when squeezed to expel a maximum of a little more than twice the maximum desired quantity to be dispensed. In the preferred embodiment, honey is dispensed for coffee or tea, and so reservoir (3) is preferably able to expel a little more than one teaspoon (ca. 5 mL) meaning that a little more than two teaspoons is suitable (ca. 10 mL). It has been determined for an average liquid honey in the case of a square section channel (2) that the channel section should be dimensioned between 12mm by 12mm to 17mm by 17mm and preferably 14mm by 14mm. If the channel dimensions are too large, it is then more possible that the viscous liquid can flow around the bubble thus making the measurement inaccurate. If the channel dimensions are too small then the viscous resistance becomes great and the required length of the channel to measure a substantial quantity becomes very long.

It is to be understood that the above description of the preferred embodiment is not intended to limit the scope of the invention as defined in the appended claims.

## CLAIMS

1. A viscous liquid dispenser comprising a reservoir for holding the liquid, at least a part of the reservoir being resiliently squeezable, characterized in that the dispenser  
5 comprises:

a substantially vertical measuring channel having a cross-section suited to allow a bubble of air in the liquid to move along the channel with a flow of the liquid therein, the bubble in the channel for measuring a quantity  
10 of the liquid to be dispensed;

a spout in communication with an upper part of the channel; and

air trap means including an air chamber and passage means, a lower end of the channel being in communication  
15 with one side of the chamber, and the passage means communicating an opposite side of the chamber with the reservoir, whereby, upon squeezing the reservoir, the flow of the liquid through the passage means to the lower end of the channel across the chamber from said opposite side to  
20 said one side is able in use to release the air bubble from the chamber into said lower end and, upon releasing the reservoir, to replenish the chamber with air drawn back through the spout, channel and air trap means to the reservoir.

25 2. A dispenser for dispensing a viscous liquid, the dispenser to be connected with a reservoir for holding the liquid, at least a part of the reservoir being resiliently squeezable, the dispenser characterized in that it comprises:

a substantially vertical measuring channel having a cross-section suited to allow a bubble of air in the liquid to move along the channel with a flow of the liquid therein, the bubble in the channel for measuring a quantity  
5 of the liquid to be dispensed;

a spout in communication with an upper part of the channel; and

air trap means including an air chamber and passage means, a lower end of the channel being in communication  
10 with one side of the chamber, and the passage means communicating an opposite side of the chamber with the reservoir, whereby, upon squeezing the reservoir, the flow of the liquid through the passage means to the lower end of the channel across the chamber from said opposite side to  
15 said one side is able in use to release the air bubble from the chamber into said lower end and, upon releasing the reservoir, to replenish the chamber with air drawn back through the spout, channel and air trap means to the reservoir.

20 3. Dispenser as claimed in claim 1 or 2, characterized in that said chamber is substantially squeezable, such that the bubble is released by the chamber when the chamber is squeezed.

4. Dispenser as claimed in claim 1 or 2, characterized in  
25 that the flow leaving the passage means into the air chamber is directed towards a top of the chamber at said opposite side, such that said flow through the passage means to the channel pushes into the chamber and forces the bubble out of the chamber at said one side.

5. Dispenser as claimed in claim 4, characterized in that said chamber is located forward of said lower end, such that said dispenser may be tilted in a direction of the spout to help release the bubble.
- 5 6. Dispenser as claimed in claim 1 or 2, characterized in that it further comprises closure means to close fluid communication between an exterior of the dispenser and the channel.
7. Dispenser as claimed in claim 6, characterized in that  
10 said closure means comprise a cap for the spout.
8. Dispenser as claimed in claim 1, characterized in that the reservoir comprises a fill opening, the opening to be covered and sealed by a screw cap, such that the reservoir may be filled and refilled.
- 15 9. Dispenser as claimed in claim 1 or 2, characterized in that it further comprises graduation lines on the channel, the channel being transparent or translucent to make the bubble visible; such that the bubble in conjunction with the graduation lines may be used to indicate a part of the  
20 quantity dispensed.
10. Dispenser as claimed in claim 1, characterized in that the channel is provided outside said reservoir.
11. Dispenser as claimed in claim 1, characterized in that it is integrally blow moulded from a transparent or  
25 translucent plastic material.
12. Dispenser as claimed in claim 1 or 2, characterized in that the viscous liquid is honey, and in that said cross-section is substantially square shaped and measures between 12mm by 12mm and 17mm by 17mm.

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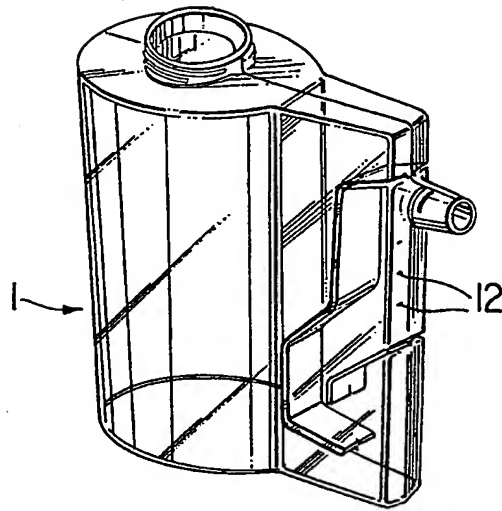


FIG. 1

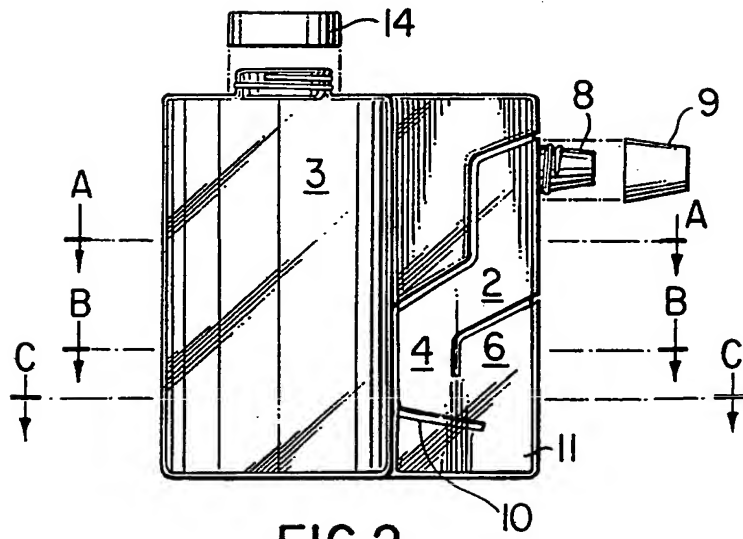


FIG. 2

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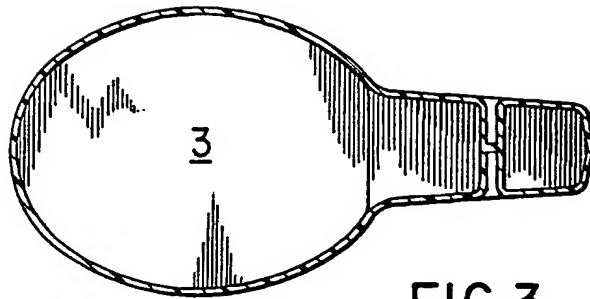


FIG. 3

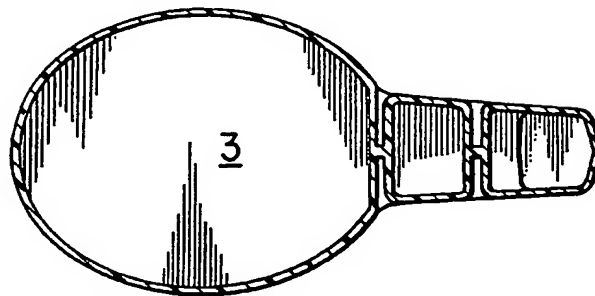


FIG. 4

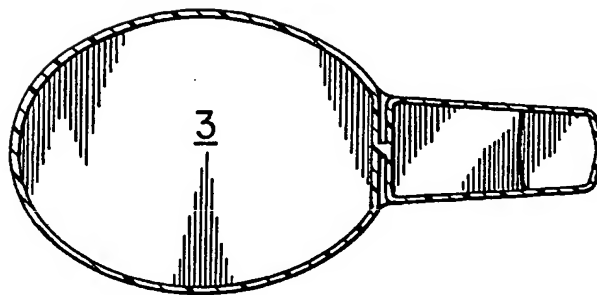


FIG. 5

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/CA 91/00291

<b>I. CLASSIFICATION OF SUBJECT MATTER</b> (if several classification symbols apply, indicate all) <sup>6</sup>		
According to International Patent Classification (IPC) or to both National Classification and IPC		
Int.Cl. 5 G01F11/26; G01F11/28		
<b>II. FIELDS SEARCHED</b>		
Minimum Documentation Searched <sup>7</sup>		
Classification System	Classification Symbols	
Int.Cl. 5	G01F ; B65D	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched <sup>8</sup>		
<b>III. DOCUMENTS CONSIDERED TO BE RELEVANT<sup>9</sup></b>		
Category <sup>10</sup>	Citation of Document, <sup>11</sup> with indication, where appropriate, of the relevant passages <sup>12</sup>	Relevant to Claim No. <sup>13</sup>
A	EP,A,0 010 965 (BETRIX LTD) 14 May 1980 see abstract see page 3, paragraph 4  ---	1,2,6-11
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<b>IV. CERTIFICATION</b>		
Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report	
06 APRIL 1992	15. 04. 92	
International Searching Authority EUROPEAN PATENT OFFICE	Signature of Authorized Officer MARTIN A.G.M. <i>AMat</i>	



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EP-A-0010965	14-05-80	GB-A, B 2038779	30-07-80

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